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ABSTRACT

Many interpretive nature trails have been established for the visually impaired in recent years. The objectives of the investigation were to (a) identify what has been done in the past in the way of nature trail design for the visually impaired, (b) compare this with what professional workers for the visually impaired consider important in the design of the facilities, and (c) to provide guidelines for the design of future trails for the visually impaired. It was determined that the "typical" nature center was over five miles from the nearest urban center, not on public transportation lines, and provided a single special trail for the visually impaired with guide ropes and braille signs. As a result of the literature search, the informal interviews with visually impaired students, and the survey of Orientation and Mobility Instructors, the following suggestions are made for the design of future nature trails: (1) No special trails should be established, as these tend to isolate the visually impaired from the rest of the visitors; (2) all trails should be clearly differentiated from the surrounding environment so that the visually imparied can use residual sight or proper mobility techniques for travel; ropes are unnecessary and often vandalized; (3) special pavement is not needed; (4) railings should be provided at hazardous areas; and (5) interpretation should be offered through the use of portable cassette tape players, and booklets for the hard of hearing. (Author/RH)

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NATURE TRAILS FOR THE VISUALLY IMPAIRED

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The past 15 years have witnessed a proliferation of nature trails designed for use by the visually impaired. Not only nature centers, to which the task of creating such facilities has normally been relegated, but public schools, city park departments, and colleges have felt a need for them. As will be shown below, these trails can play an important role in educating the visually impaired about the world in which we all live. Thus, great care must be taken in their design. The investigation outlined here was initiated in order to develop a set of criteria for this task.

Thanks are to be given to all those who took the time to fill out and return the surveys, as well as Dr. David Hanselman of the College of Environmental Science and Forestry; Dr. William C. Ritz of the Environmental Studies Institute of Syracuse University; Mr. Milton Rosenblum of the Lighthouse of Onondaga County, New York; and Mr. John A. Weeks of Onondaga Nature Centers, Inc.

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Chapter I

The Visually Impaired

The visually impaired pose some unique challenges to the interpretive naturalist. Because of their impairment, they have special problems with getting about, with learning about the environment, and with how they are treated by the seeing public: All too often visually impaired individuals are considered to be part of a homogeneous, stereotyped group. Their reactions to this treatment, as well as the physical difficulties they experience in an interpretive setting, must be understood by the naturalist if he is to work with them. This section attempts to provide this understanding.

Definitions, and the Number of Visually Impaired

Those with less than normal sight have been referred to as "the blind," "the visually handicapped," "the sightless," and "the visually impaired," these terms often being used interchangeably. For convenience the following definitions will be used in this paper:

> Visually impaired: all those with less than normal functional vision (abbreviated "VI").
>
> Blind: a special group among the VI, those who have been cast by society into the stereotyped role of "the blind-man" (after Scott, 1969).
>
> Legally blind: an arbitrary classification of the VI (less than 20/200 vision in the better eye, or less than a 20 degree visual field in the better eye) used by some states for legal purposes.

There is no thought that these definitions will or should supplant common usage; rather, they are used here only to describe a unique sociological phenomenon. Where other terms (or the term "blind" used in a general sense to mean all visually impaired persons) are used by sources quoted, the materials will be used unaltered

Numbers. No one knows for sure how many VI persons there are in the United States. This is due to some degree to the many different definitions in use--Dickman (1972, p. 7) has found 16--which range from total lack of sight through varying degrees of visual ability. Also, there is no official census which counts the VI.

Thomas Duane (in American Foundation for the Blind, 1974) estimates that there are 90 million Americans who have some visual impairment. A 1972 report by the American Foundation for the Blind states that there are at least 6.4 million people in this country who have trouble seeing even with corrective lenses. Out of this number, 1.7 million have what was termed "severe" visual impairement (Dickman, 1973).

Legal blindness. Many states have adopted a legal definition of blindness to allocate financial aid and special services. These definitions consider a person to be legally blind if that person has a central visual acuity of 20/200 or less in the better eye with corrective lenses, or if there is a field of vision of less than 20 degrees in the better eye (a normal field of vision is between 60 and 70 degrees).

Most estimates place the number of legally blind persons in the U.S. at about 450,000 (American Foundation for the Blind, 1974; Dickman, 1972, 1973). Many states also have a legal classification of "partially sighted" for those with a visual acuity of between 20/70 and 20/200.

The Measurement of Vision

Visual acuity is measured with the Snellen Chart, the familiar device of optometrists and opticians, with rows of letters, numbers, or other symbols of graduated sizes. Each size is labelled with the distance at which a person with normal vision could distinguish the characters. If a person, standing 20 feet from the chart, is able to read the line which most others can read at that distance, that person is said to have 20/20 vision. If at 20 feet the symbols smaller than those in the line which most can read at 100 feet cannot be distinguished, the person is said to have 20/100 vision.

The Snellen Chart, however, is unable to detect fine differences in visual

acuity. Normally there are no lines between the 20/100 and 20/200 lines. Thus, even though a person's visual acuity is not as low as 20/200, that person can be placed in that group which the law calls "blind." Many people who are classified as legally blind are fully capable of leading normal lives: Visual acuity is not the perfect test of visual capacity.

Perhaps a better way to judge a person's visual ability is "visual efficiency." A 1955 report of the Section on Ophthalmology of the American Medical Association (quoted in Lowenfeld, 1973, p. 30) defines visual efficiency to include visual acuity at a distance and for near vision, as well as factors such as visual fields, ocular motility, binocular vision, adaptation to dark and light, color vision and accomodation. Lowenfeld includes all this in his definition of "functional visual efficiency" along with environmental influences and effects, the attitude of the individual towards the impairment, and personal motivation. It might be mentioned here that attitudes, both of the VI and those around them, are perhaps the most important factor in determining whether a VI individual will lead a happy and productive life. The rehabilitative services and equipment are generally available; but the VI must feel they can benefit from it or it is useless.

Age Distribution Among the VI

Of the estimated 1.7 million Americans with severe visual impairments, a little over 3%, or about 60,000 persons, are in school or are of pre-school age. Another 18% are between the ages of 18 and 44 (Murphy, 1973, p. 2). These are the people who might be expected to have had training in braille or other specialized techniques used by the VI in working or day-to-day living. Over 65% of the VI are 65 years of age or over and, according to the National Society for the Prevention of Blindness, more than 50% of new cases of visual impairment occur in this age group.

Causes of Visual Impairment

Infectious diseases. The chief reason for the unequal age distribution among

the VI is to be found among the causes of visual impairment. In the past, the population of VI was much younger than at present, the major causes having been industrial accidents and infectious diseases. In 1940, more than 20% of all cases of visual impairment were caused by infectious diseases, chief among them being ophthalmia neonatum, parental syphilis, and trachoma (Dickman, 1972, p. 11).

Ophthalmia neonatum or "babies' sore eyes" is caused by an infectious organism in the birth canal of the mother. If the child comes into contact with the organism at birth, loss of vision can occur. However, the administration of silver nitrate drops to the eyes immediately after birth eliminates the infection, and by 1954-1955 ophthalmia neonatum accounted for only about 1% of new students in schools for the VI (Wood, 1960, p. 6). In many states, silver nitrate treatment is now required by law.

The threat of visual impairment from parental syphilis has been almost eliminated through public health measures such as educational campaigns, required premarital and prenatal blood tests, the development of sanitation and immunization methods, and new drugs. These new drugs and health measures have also largely removed the dangers of smallpox, diphtheria, trachoma, scarlet fever, and tuberculosis, all of which may pose a threat to vision, and many of which primarily strike children. Thus in 1962 the percentage of VI who had lost their vision because of infectious diseases was down to 5% (Dickman, 1972, p. 11).

Of the approximately 60,000 children with visual impairments, about 70%, or 2.1% of the total VI population, were born with the condition (Dickman, 1973, p. 6). This percentage has remained fairly constant in the recent past, with the exception of the 1964-1965 rubella epidemic, and the flare-up of retrolental fibroplasia.

When a woman contracts rubella (German measles) in the first three months of pregnancy, the effect on the unborn child can be loss of vision due to congenital cataracts, deafness, heart conditions, and mental retardation. Usually there is a combination of defects. It is believed that as many as 40,000 children may have been affected during 1964-1965. A major campaign to protect the unborn has been under-

taken, mainly through the vaccination of school children who otherwise might spread the disease to their mothers.

Between 1940 and 1954, many thousands of children lost their sight to a condition known as retrolental fibroplasia (RLF), the development of fibrous tissue behind the lenses of babies who were born prematurely. It was discovered that RLF was not caused directly by the prematurity of birth, but rather by the routine administration of oxygen to babies in incubators. Once the cause of RLF was discovered, the number of cases dropped dramatically, until by 1960 RLF accounted for less than one-tenth of 1% of new cases of visual impairment (Dickman, 1972, p. 12).

"At-risk" babies. Although many of the causes of visual impairment among children have been eliminated or greatly reduced, there are still many children being born with impaired eyesight. This is because we are now saving many who only a few years ago would not have a chance of surviving--babies born prematurely, those with severe genetic defects, or unfortunates such as the thalidomide babies whose mothers took drugs during pregnancy. These children too are often born with more than one defect, including deafness and mental retardation, and many will spend much of their lives in wheel chairs.

Accidents. In recent years there has been a decrease not only in the incidence of visual impairment due to infectious disease, but also in cases caused by accidents. The National Society for the Prevention of Blindness, the American Foundation for the Blind, Lions Clubs, and many industries and schools have worked to prevent accidental loss of vision. Radio and television campaigns have brought awareness of the need for care into the homes of the public. Most industries now require the use of safety glasses for all dangerous jobs, and school children are taught from the start to wear goggles in labs. Federal law now required that eyeglasses be made of shatter-resistant glass or plastic. Fireworks are now illegal in many states, and many national and local consumer protection agencies are working to make the public aware of dangerous toys. As a result of these developments, accidental injuries now account for fewer than 3% of the VI (Dickman, 1972, p. 10).

Old age. All the while that loss of vision due to accident or infectious disease has been decreasing, visual impairment due to age-related conditions has risen. Thanks to better nutrition and improved medical care, we live longer than people have at any time in recorded history--only to find that more and more of us are falling prey to the infirmities of age itself. Four diseases or conditions associated with old age--senile cataracts, glaucoma, diabetes, and macular degeneration (affecting the area of central vision)--now account for almost 50% of the VI (Dickman, 1972, p. 13).

Senile cataracts account for about 17% of all cases of visual impairment. They are correctable by surgery, the rate of success being about 95%. Glaucoma is responsible for about 12.5% of new cases of visual impairment (Dickman, 1972, p. 13). It produces an obstruction to the circulation of the aqueous humor, and a loss of peripheral vision. While the progress of glaucoma can be halted, the damage cannot be undone.

Diabetes has been tempered in its effects by the development of insulin. Thus many diabetics now live long enough to suffer the retinal changes, including hemorrhaging inside the eye, associated with diabete's later stages. Arteriosclerosis, a vascular disease most common in the elderly, which produces degenerative changes in the blood vessels of the eye, is also increasing in incidence.

Chapter II

Understanding the VI

The "Blind-Man" Syndrome

According to Scott (1969), the sociological phenomenon of the "blind-man" is created in two ways. One is through contact with blindness agencies, the other is through everyday interaction with the sighted.

The "blind" and society. When a normally sighted person comes face-to-face with someone who cannot see, the sighted person tends to display certain preconceptions about visual impairment which the VI individual must respond to, even if only to reject them. At each new encounter the VI must fight again for self-respect and especially individuality (Cutsforth, 1951, p. 17). Through the impairment alone, the VI may sometimes elicit helping responses, or strange and negative reactions on the part of people who think of them in terms of false stereotypes (Lisenco, 1972, p. 14). The VI is not treated as an individual, but as a "blind-man."

There are many stereotyped ideas about the VI. Many people believe that all "blind-men" are deaf as well. Thus the VI are often subjected to the indignity of being talked about, rather than to. In one case, a guide dog was addressed instead of its owner (Dickman, 1972, p. 4). Another image of the "blind" portrays them as being incredibly stupid, needing to be treated like children.

The person who has lost all vision must, in order to move about freely, learn to pay attention to very slight changes in the environment (temperature, drafts, echoes) that are usually overlooked by those who rely primarily on sight. This skill, learned through hard work, has given rise to other stereotyped images of the "blind." Many believe that it is a "sixth sense," developed immediately upon loss of sight, which guides the "blind" around obstacles that the sighted could not imagine tackling themselves. And of course there is the idea that, because of their heightened senses,

the "blind" are excellent musicians, or piano tuners, when in fact the proportion of VI who are tone-deaf is most likely the same as among the sighted.

The world of the VI is often perceived by the sighted (whose world is visually oriented) as a place of great fear, the common belief being that the nonsighted are confronted with a "world of experiential darkness filled with all the horrors of gloom, fear, loneliness and whatever else the timorous seeing experience in the dark" (Cutsforth, 1951, p. 129). Actually, darkness too is an experience that depends on sight; those who have lost all vision can no more experience darkness than light.

The sighted also tend to think of the VI as having one great desire to view again the beauties of nature. Actually, studies have shown that there is no specific desire to see for the mere sake of seeing, even among adults who had recently lost their vision. Rather, according to Cutsforth (1951), many felt as if they should have such a longing and that there was something wrong with them for not being disturbed.

There are additional reasons why the sighted may feel uncomfortable in the presence of the VI. Much of our communication is non-verbal, with an important part being played by gestures and eye contact. The VI cannot see the many gestures and facial expressions which are so much a part of communication among the sighted, and therefore never use them unless trained to. Thus, the sighted can at times have the uncomfortable feeling of talking to an unfeeling zombie.

th

Without sight, the VI cannot experience eye contact, and unless they concentrate on facing the person to whom they are speaking will often upset that person by appearing to look off into the distance. This occurs because the natural inclination when talking to someone who can't be seen is to aim one ear at the person, so as to hear better.

Another source of discomfort for the sighted are "blindisms," such actions as twitching, jerking the head, poking at the eyes, nose and ears, and similar forms of automatic self-stimulation. Since the VI (especially those born without sight) have limited awareness of the world beyond their reach unless carefully guided into

exploration, they tend to derive stimulation from the closest thing at hand, their own bodies. Blindisms can make the sighted extremely uncomfortable, and anxious to avoid situations where they might be subjected to them.

Finally, every social exchange is just that--an exchange, or trade--and here again the VI can suffer from their contact with the sighted. When we do a favor for someone, we are usually rewarded in one or more of three ways: the gratitude of the recipient, a chance for the return of the favor, or social approval (Scott, 1969, p. 34). The vocal gratitude of the one who has been helped is usually enough. However, doing someone a favor places the recipient under an obligation which is best discharged through a return of the favor--a cycle of give and take.

For the VI, the reciprocity of social encounters cannot exist, for they sometimes need the help of the sighted, but cannot always return the favor. Thus, not only is the sighted person made uncomfortable in the presence of the VI, due to blindisms or misconceptions about the condition of visual impairment, but the only reward for this discomfort may be social approval for an act of charity. This is not to say that the VI do not have firm and lasting friendships with the normally sighted, but most day-to-day contacts are with strangers, and it is their reactions to and treatment of the VI that forms the VI individual's self-image.

Blindness agencies. There is no question that the congenitally VI need special training at one time or another in how to get about and function in a world based on sight. Most of those who are born with sight and lose it later in life (the adventitiously VI) also require some help immediately following the loss of vision. Many persons of both groups may need to receive such help indefinitely. It is to gain such aid that the VI turn to the many charitable blindness organizations throughout the country. And it is here also, according to Scott (1969) that the creation of "blind" people continues.

Scott describes two approaches taken by blindness agencies towards the rehabilitation of the VI. The first of these, the restorative approach, championed by Father Thomas Carroll, contends that most sightless people can be "restored" to

an independent, reasonably normal life.

Those agencies operating under what Scott calls the accomodative approach feel that the VI are essentially helpless, and will end up centering their entire lives around the agency. Those few people who do break away and lead independent lives are considered to be the exception rather than the norm. The "sheltered workshops" that exist in many of our cities are examples of accomodative agencies.

Although most of the agencies in this country proclaim the desirability of the restorative approach, Scott claims that many in fact tend toward the accomodative. It is not only the beliefs of the agency staff that influence the approach used, but also outside pressures, both social and economic. As mentioned above, cntact between the sighted and the VI can be awkward for both. Although occurring with ever decreasing frequency, there is still some pressure to keep the VI hidden away (Scott, 1969, p. 92).

Verbalism

In the context of the VI. "verbalism" may be defined as the use of words which have no meaning in the experiences of the individual. It is often a symptom of the unreality that frequently exists in the minds of the VI. Harley, in his 1963 study of verbalisms among VI children, considered a verbalism to exist when a child gave an acceptable definition of a word, but was unable to accurately identify the object symbolized by the word through some sensory means (1963, p. 11).
Verbalism exists to some degree in all children, but especially among the VI, who have much more restricted contact with the world. Consider this statement by a VI woman who had just completed mobility training (discussed below): "Before I started training, I didn't even know what a street was" (Murphy, 1973, p. 11). Even the most commonplace items--commonplace, that is, to those who can see them almost anywhere they go--may be beyond the experience of those who cannot see.

The danger of this use of words without meaning is that "abstraction is built upon abstraction, resulting in hazy and inaccurate understandings of [the VI

individual's] environmental surroundings" (Harley, 1963, p. 9); that is, the VI individual will tend to drift further and further into a private world, despite all attempts to draw the individual into society.

Harley found some verbalisms to be much more prevalent than others. "Farm" and "nature," more removed from the home, proved to be the most difficult categories in identification of items (1963, p. 43). Most of Harley's subjects (39 out of 40) had spent the major part of their lives in a residential school setting, which might have biased his results in favor of these areas; however, the VI are restricted in their mobility, and, as a large percentage of the VI live in urban areas, they can be expected to have had little experience with those things related to rural life or natural history.

In Harley's study, words such as "rabbit," "mouse," and "squirrel" elicited a high degree of verbalism. Most sighted children would have become familiar with these animals when they were common to their environment through vision. Otherwise, it would be a simple task to

> illustrate these animals with pictures in the books or with material supplied by the teacher. However, the blind child does not have these opportunities for visual experience. (Harley, 1963, p. 48)

And of course the child who has had limited sensory contact with the immediate environment will, unless properly educated, grow up without a clear view of the world in which he/she lives.

Cutsforth (1951), who also experimented to determine the use of verbalisms among young children, cites the writing of Helen Keller as an example of the way in which the VI can learn to live in an unreal world. In one case, for example, she describes the way in which the moonlight shimmers on a lake on a soft summer evening--a poetic description of a vision which she never experienced herself. (Cutsforth, 1951, pp. 51,62).

Cutsforth concluded that the underlying purpose of verbalism is the meeting of social approval; that to be accepted by the sighted, the VI learn to speak like them and pretend to experience the world in the same way, even though it may be personally

meaningless. Harley (1963) disagrees. He feels that verbalisms are a result not of a need for social approval, but rather of a lack of direct experience (p. 52). The VI use meaningless words to describe a situation because it has in fact only been experienced through words. With direct experience, the situation could be described meaningfully. Rather than proceed from this point, many teachers of the VI have tried even harder to give their pupils what they are "missing." Cutsforth tends to support this:

> We have not even so much as attempted to educate the blind, for we have been spending all our efforts educating the seeing who cannot see. By charitably giving them what they cannot possibly use, we have robbed them of most of that which they possess. (Cutsforth, 1951, p. 51)

That is, rather than taking the VI by the hand and guiding them through personal contacts with the environment, we give them mere words, forcing them to trade the real world as they can experience it for a shadow of the world of the sighted.

Many educators of the VI (Cutsforth, 1951, p. 7; Harley, 1963, p. 32; Lowenfeld, 1973, p. 41; to name a few) believe that it is only by providing the VI with direct sensory contact with their environment that teachers can give them an understanding of the world in which they live. Harley found that the younger children in his study exhibited a greater degree of verbalism, suggesting that the VI especially need "earlier, more direct, firsthand experience with their environment if verbalism is to be reduced" (1963, p. 23). Lowenfeld (1973) points out that "giving blind children a knowledge of the realities around them is not a question of enriching the child's vocabulary, but of giving him a sense of reality about his environment" (p. 43).

By providing facilities and activities to enable the VI to explore the natural world firsthand and become familiar with many situations otherwise unreal to them, the nature center can give the VI a better understanding of the world.

Getting About

People who can see often depend upon their sight to the exclusion of the other

senses, or to back up the other senses even when it is not really necessary. An example given by Murphy (1973) is that of reaching into a pocket to find a coin. The person doing so will find coins of different sizes, some with rough edges, some with smooth. These are actually enough clues to extract the desired coin, but the person will usually look to be sure. Sight is used to integrate and back up the messages of the other senses. The VI individual does not have the benefit of this ability. To manage the daily routine, the VI must consciously organize the information received from all the other senses mentally.

The skills used by the VI in getting about include orientation, the art of using the remaining senses to find out where one is through the use of landmarks, and mobility, the actual moving from one point to another. As with the ability to read braille, how much skill a VI individual develops in orientation and mobility depends very much upon that person's motivation. An elderly person might wish only to move about the home and attend to personal needs, while a child, or another, more highly motivated older person might want to maintain an active social life.

Orientation. In the processes of orientation and mobility (O&M), the VI use all of their available senses. If the individual is partially sighted, vision or light perception may play an important role. Hearing involves not only direct sounds from people or machinery, but also the detection of echoes, or "sound shadows" where noises are screened by another object. By paying close attention to sound, the VI can determine the direction, distance, size and structure of an object. "Object perception," the ability to perceive extremely close objects by seemingly feeling a change of pressure on the face, has been explained as the detection of sounds so faint as to be imperceptible to the untrained (Murphy, 1973, p. 4).

O&M skills also include the detection of odors and temperature change, kinesthesis, and touch. Touch involves more than just the hands; the feet, the face, in fact all parts of the body are sensitive to contact with the ground, walls, furniture, the air.

Temperature change tells much to one who is sensitive to it, as the mobile VI

must be. The cool breeze from an open window in summer, the changes in the air as one leaves a thicket and walks out into the open, the heat from the radiator in the living room, the coolness under a tree on a sunny day, these are all clues about the environment.

Kinesthesis is the feeling of movement in the muscles. It is this feeling that lets us find our mouths when we eat, tie our shoelaces without looking, or move our foot from the gas pedal to the brake without taking our eyes from the road. It is kinesthesis that enables us to feel that an orange is round, that we are walking up or down a slope, or helps us to find the light switch in a dark room.

Landmarks. Landmarks are familiar objects with known locations that help us know where we are. While driving, we may look for a particular store that is one block from home. On a smaller scale, one often describes a spot in a room with reference to the door or a window. Landmarks give us a frame in which to operate.

For the VI, landmarks have an added importance, since the integrating sense of sight is missing. In moving about, the VI may refer to such things as a clock ticking loudly, the smell of flowers by the front door, the feeling of damp coolness under the tree in the backyard, the squeaky floorboard in the bedroom. These landmarks give a sense of security to the VI as they move about.

Mobility. The most commonly used aid to travel among the VI is the familiar white fiberglass or aluminum cane. This cane is fitted to its user, the length being determined by the user's height, length of stride, and comfort.

The cane is used by moving it in an arc in front of the body, placing it where the next step will land. As the foot is placed on the ground, the cane is moved to the other side. Canes are also used to follow "shorelines," the edges formed by the meeting of two surfaces, such as the water meeting the sand at the beach. "Shorelining" can involve following the edge of a fence, or the grass along a sidewalk, or the intersection of floor and wall.

The cane not only allows the user to follow a path, but provides much information about the environment. For instance, with it the VI can easily tell a

grassy area from bare dirt. The cane does not, however, inform the user of, or provide protection from, overhanging obstacles such as low branches.

Often when the VI travel in an automobile, or attend a social gathering, they will use a short, collapsible aluminum cane instead of the prescription cane. Although not as reliable as the cane which was fitted to the user by an O&M instructor, these canes have the advantage of being easily folded up and placed in a purse or pocket when not in use.

The danger of overhanging obstacles can be avoided through the use of a guide dog. These animals are trained to avoid dangers which are not detectable with a cane. Guide dogs are given rigorous training for the basic commands, as well as how to respond to curbs, pedestrians, traffic, and obstacles above ground level. The dogs are also taught "intelligent disobedience," that is, to refuse a command when there is danger. Although dogs provide a faster rate of travel, the user tends to obtain fewer details about the environment, not needing the intensive interaction with it as needed when relying on his or her own senses.

The VI are never refused the services of a dog because of inability to pay, but great care is taken in matching a dog with a prospective user. The criteria established by the Seeing Eye, Inc., of Morristown, New Jersey, are that the user be between 15 and 65 years of age, in good health, with good hearing, and must possess the temperament and emotional stability to work with a dog. The user usually spends one month at the school where the dog was trained, learning to work with it. Other guide dog agencies have slightly different criteria. Only about 1% of the VI use guide dogs (Murphy, 1973).

Maps. Once given O&M training, the VI can get about almost anywhere with the tools this training provides. The VI must, however, still have information about where they are with respect to their environment, and how to get from one point to another. To this end, they can be provided with maps. Maps for the VI are generally of two types: haptic, or tactile maps; and auditory maps, usually recorded on magnetic tape.

Craven (1972) has described a method for mass-producing haptic maps. Discarded aluminum photo-offset printing plates have the map drawn on them in reverse. Then, various tools, such as dentists' "picks" are used to punch lines, dots, or other symbols into the soft metal. When the plate is turned over, the map can be seen in its true orientation. This master can be used to make many copies in a thermoform machine. Although very useful in studying geography, or in just learning one's way around the neighborhood, haptic maps require some practice. One who is experienced in their use could learn much from a complicated map, while a novice would remain totally confused (Craven, 1972).

Blasch, Welsh, and Davidson (1973, p. 146) also point out that only a limited amount of information can be provided the most skilled user of a haptic map. If taken out of the home or classroom, these maps provide further difficulties. To be portable, the map must be small, and this in turn limits its content, detail, and legibility. Even if made of a material which can be folded or rolled up (such as thermoform sheets) the maps would still have to be unfolded and read. There is also the difficulty of reading the map with numb fingers on a cold day (Blasch et al., 1973, p. 153).

To eliminate these problems, Blasch et al. suggest the use of auditory maps, tape-recorded verbal descriptions of a particular route or geographical area, and a presentation of the relevent landmarks (1973, p. 145). With them, a person with normal mobility skills can travel about an unfamiliar area without fear of getting lost. Besides very specific directions for getting from one point to another, the auditory map can provide cautions about specific danger areas, suggestions for particular cane techniques or alignment procedures at various points, and, in an interpretive setting, the interpretive messages.

Chapter III

Some Existing Interpretive Facilities for the VI

Very little has been written about interpretive nature facilities for the VI; what follows here is taken primarily from magazine articles published in the past few years, personal correspondence, and from trail guides provided by some of the nature centers which have such facilities. Much more information has been obtained through the surveys in this study, and is provided in a later section.

Fragrance Gardens

One method which has been used to teach the VI about nature is the "fragrance garden." This is a garden where the plants have been chosen for their odor (and in some cases texture or taste) rather than for any visual beauty. The best-known example of one of these gardens in the north-east is the Brooklyn Botanical Garden's "Fragrance Garden for the Blind." This particular gardenis divided into four sections: one where the plants were chosen for leaves which are fragrant when crushed, one with plants of unusual texture, a third containing plants with aromatic blossoms, and the fourth with various kitchen herbs. As with most fragrance gardens, the flower beds are elevated to waist height, with a restraining wall and a railing which the VI can follow. The plants are labelled in braille.

Fragrance gardens have come under attack by many persons concerned with the VI. Father Thomas Carroll, a proponent of the restorative approach to VI rehabilitation, was among the first to voice opposition to the concept. He felt that the idea of a segregated garden presented a serious threat to the dignity of the VI and to efforts to have them accepted into sighted society. At the tenth annual convention of the Blinded Veteran's Association in New York City (1955, the year when the Brooklyn garden opened), Carroll said:

> What is going to happen to all your efforts to have blind people accepted as a part of normal society if without a word of protest you allow this fragrant publicity to go all over the country? These smell gardens reek of sentimentality. They have the stench of pity and rejection. They are redolent of the poisonous aroma of segregation, of what I have previously called the ghetto of the blind . . . be it resolved that the BVA is opposed to any special gardens or sections of special gardens being set up for the blind. (Fragrance Gardens in the News Again, 1972)

At the same time, an editorial in the New Outlook for the Blind, published by the American Foundation for the Blind, stated that fragrance gardens "smack of isolation, segregation, paternalism, sentimentality, exploitation of the blind for other's benefit, and perpetuation of stereotypes" (Editorially Speaking, 1955). The editorial further stated that such projects cost more than any benefits they might provide would warrant.

Nature Trails

The Oerwood Nature Center in York County, Pennsylvania, has a "Braille Trail" that is representative of most such trails. This trail, constructed by a local high school's Ecology Club, consists of a half-mile loop. All poisonous plants have been removed, and visitors are warned of other hazards, such as bridges or boggy ground by trail signs, written in braille, and with large block print for the partially sighted, side by side. Visitors are directed from one station to the next by guide ropes, which are also used as an interpretive device. At intervals, knots are tied in the ropes. One knot signifies that there is something interesting to touch nearby, while two knots indicates an odor. In this way, the ropes serve the function of the more expensive signs. At one point, visitors are encouraged to tie a length of cord to the main rope and go off into the woods, meeting obstacles and thereby "deriving a greater closeness with nature" (Brett, 1971).

The National Arboretum, in Washington, D.C., has a "Touch and See" nature trail. In contrast with most trails, where the visitor is led in a loop so as to end up where he or she started without backtracking, this is a two-way trail. A one-half inch

manila hemp rope leads the visitor out along one side and back along the other. The rope is cut and tied at each station to facilitate repairs should one section be damaged. The Arboretum has reported some trouble with the plastic braille signs originally used, which did not weather well (Garvey, 1969).

The Hale Camping Reservation, in Massachusetts, has adapted two of its trails so that VI campers can accompany others on nature walks. As in the two trails described above, the main adaptations here were the placing of braille-embossed plates next to plastic-laminated block print signs along the trails, and the stringing up of three-fourth inch, bright yellow (providing better visibility for the partially sighted) polypropylene rope (Spinelli and Earley, 1972).

In 1973, John Knorr, at the University of Wisconsin in Madison, published A United States Guide to Nature Centers and Trails for the Visually Handicapped. The Guide lists 41 such nature trails, and gives a brief description of each. During the fall of 1973, Mr. John Kiernan, Director of the New York State Department of Environmental Conservation's Rogers Education Center, wrote to the centers listed in the Guide for advice on constructing a special trail at the Rogers Center. He received 25 replies, amplifying the descriptions given in the Guide.

Of the 41 trails listed in the Guide, 30 specifically mentioned the use of braille signs, while seven said they use tape recordings. One center in particular stated that the use of tape cassettes for all visitors was more economical (Olson, 1973). Prices quoted for the preparation of braille signs ranged from $2.00 per plate when aid was received from a charitable organization (Jordan, 1973), to $40.00 per braille sign at the Petersburg National Battlefield in Virginia (Superintendent, Petersburg N.B., 1973). Four of those responding to Mr. Kiernan's inquiries stated that they had experienced some vandalism of the signs.

Seven of the nature centers indicated that the special trails were paved with either blacktop or concrete, while the Executive Director of the Connecticut Audubon Center, in Fairfield, Connecticut, wrote that flat cedar bark chips have been used successfully not only for ambulatory visitors, but for wheelchairs as well (Case, 1973.

Guide ropes were reported used by 18 nature centers out of the 41, five of these centers indicating trouble with vandals. Roland Jefferson, botanist at the National Arboretum in Washington, D.C., wrote that "the guide ropes we use are frequently cut by vandals; and so far we have been unable to locate a suitable inexpensive substitute material" (Jefferson, 1973).

Vernon Zarlingo, District Ranger in the Santa Catalina Ranger District in (Tucson) Arizona, wrote that when a trail for the VI was being planned for the Coronado National Forest, "we felt that a post and guide rope installation would be distracting to a sighted person" (Zarlingo, 1973). The use of a kick rail, a low railing along the side of the trail that the VI would locate with their feet or canes, was considered, but thoughts of tripping and resulting law suits discouraged this. The final solution, as put into effect, was to pave the trail with tar and rock chips. This mixture would be durable in the desert, and would be different in texture from the desert soil. The idea was that the VI would be able to locate and stay on the trail simply by noting the difference in texture.

Chapter IV

The Investigation

Procedure

In the spring of 1975, a study was undertaken at the State University of New York, College of Environmental Science and Forestry in Syracuse, New York, in cooperation with the Environmental Studies Institute of Syracuse University, to investigate interpretive nature trails for the visually impaired. The mailing of two surveys was preceded by several years of seeking out pertinent literature, and meeting with local experts and visually impaired students at Syracuse University.

The first of the two surveys was designed to determine what had already been done by nature centers in the United States in the way of creating nature trails for use by the visually impaired, and to what effect. The second survey was sent to permanently certified orientation and mobility instructors for the visually impaired. These are people who are given extensive training in working with the visually impaired, teaching them to move about freely and otherwise lead lives as close to normal as possible. Besides the legal and ethical protection given to the visually impaired by organizations which work with them, there are no official records kept of how many visually impaired persons there are in this country. Thus, it would not have been feasible to survey the visually impaired directly.

The sample for the survey of existing nature trails was drawn from the 1975 edition of the National Audubon Society's Directory of Nature Centers and Related Environmental Education Facilities. Of the 517 nature centers in the U.S. listed in the Directory, 133 were described as having facilities or special services for the handicapped. There was no listing of facilities specifically intended for the visually impaired. Ultimately, 129 centers received the surveys, and 100 (77.5%) responded.

The sample for the survey of orientation and mobility instructors was drawn from

the official list of the American Association of Workers for the Blind, Inc., Committee on Certification of Orientation and Mobility Instructors. This list contained the names of 184 persons in the United States who had been permanently certified as of the fall of 1974. Of the 184 persons, 161 were reached through the mails, and 113 (70.2%) responded.

Results

The adjusted percentages of respondents answering each question on the surveys have been entered on the copies of the survey instruments provided at the end of this chapter. Some excerpts from the data are given here.

Survey of existing facilities. Only 34% of the nature centers responding to this survey have any facilities for the VI, the majority of these being a single special trail.

It was interesting to note the large percentage of nature centers that are more than five miles from the nearest urban center. Since the VI are limited in their ability to travel, many of the facilities designed for them may be beyond their reach. The small percentage of nature centers accessible by public transportation (36.6% of all centers, 24.2% of centers with special facilities) would seem to bear this out. Even some of the 52.9% of the centers with special facilities that are within five miles of a city must not be on public transportation lines.

When asked whether the primary users of their special trails are sighted or VI, only 3.8% of the centers responded that the facilities were used mostly by the VI.

A knot in a guide rope was the method used by the largest percentage of nature centers to signal an interpretive site.

The reason given by the largest percentage of the nature centers for the establishment of their special facilities was a felt need on the part of the operators. The reason given next most often was that the idea was suggested by a service organization.

Most of the nature centers reported that they did receive the aid of either

the VI themselves or of teachers of the VI in planning their facilities.

The interpretive device used most often was the braille sign (56.7%), while one-third of the centers indicated the use of large-print signs.

When asked for the percentage of their VI visitors who were partially sighted, two-thirds of those responding replied that they do not know. These data were very disturbing, as a knowledge of the potential audience should be the first information sought when planning an educational facility.

Most of the centers reporting the use of ropes and either braille or large-print signs stated that they had experienced trouble with vandalism.

Survey of O&M instructors. The majority of Orientation and Mobility instructors felt that the VI should not be provided with special trails set aside for their particular use, but rather that all trails be adapted for use by both sighted and VI. Most of these instructors were concerned with the adverse effects, both social and educational, of segregation.

Very few of the O&M instructors felt that guide rails or ropes would be necessary along the entire length of any trail the VI would be using. It was felt that railings would be advisable at hazardous areas.

The length of a nature trail need not be a major concern when dealing with the VI.

The method of identifying an interpretive site which was prefered by the greatest percentage of the O&M instructors was a change in the surface of the trail.

B-E/V1

SURVEY ON
INTERPRETIVE FACILITIES FOR THE BLIND

Completed by: NAME DATA GIVEN

EDUCATION/RECREATION AREA AS PERCENTAGES

OF THOSE RESPONDING

ADDRESS TO EACH QUESTION.

DATE

Directions: Check appropriate box, except where indicated.

1. The distance to the nearest urban center (population 50,000 or more) is:

ALL RESPONDENTS, WITH AND WITHOUT SPECIAL FACILITIES.

A) 0 - 5 miles. 43.6%
B) 5 - 10 miles. 11.7%
C) 10 - 20 miles. 20.2%
D) 20 - 50 miles. 13.8%
E) over 50 miles. 10.6%

2. Is there public transportation to your area?

ALL RESPONDENTS

A) yes 36.6%
B) no 63.3%

3. Your facilities for the blind include:

ALL RESPONDENTS

A) no special facilities now, 16.0%
1) will have by 1977.
2) have no plans at present. 50.0%
(STOP HERE. THANK YOU FOR YOUR HELP.)
B) a single nature trail. 21.0%
C) all nature trails. 3.0%
D) other facilities (describe). 9.0%

---

4. Compared to your other facilities, construction of those for the blind cost:

A) more. 48.1%
B) the same. 48.1%
C) less. 3.7%

5. Compared to your other facilities, maintenance of those for the blind costs:

A) more. 46.4%
B) the same. 42.9%
C) less. 10.7%

6. The name(s) of the trail(s) for the blind:

A) Emphasizes trail is for handicapped 33.3%
B) Does not emphasize is for handicapped 48.1%
C) No name 18.5%

7. The average length of these trails is:

A) from 1/8 - 1/4 mile. 46.4%
B) from 1/4 - 1/3 mile. 17.9%
C) from 1/3 - 1/2 mile. 17.9%
D) from 1/2 - 2/3 mile. 14.3%
E) over 2/3 mile. 3.6%

8. The average number of interpretive stations per special trail is: 16.2.

9. Interpretive stations are signalled by:

A) no set stations. 24.0%
B) knots in a rope. 32.0%
C) change in pavement. 4.0%
numbered posts 24.0%
rope leads to stand 16.0%

10. What prompted the installation of your facilities for the blind?

Felt need for facilities 48.1%
Suggested by service organization 33.3%
Others 18.6%

1. When designing these facilities, did you receive the aid of:

A) handicapped persons?	yes / no	69.0%
B) educators of the blind?	yes / no	79.3%
C) other outside persons? (if yes, explain)	yes / no	52.9%

---

12. The facilities for the blind include (check those which apply):

A) guide rails,	
1) everywhere.	10.0%
2) hazardous areas only.	23.3%
B) guide ropes,	
1) everywhere.	53.3%
2) hazardous areas only.	6.7%
C) kickboards.	10.0%
D) sighted guides.	50.0%
E) braille,	
1) signs.	56.7%
2) booklets.	25.0%
F) large print,	
1) signs.	33.3%
2) booklets.	6.7%
G) tape players.	26.7%
H) _____	
I) _____	

13. Please write the letters of the adaptations above that you have watched the blind use.

A1--66.7% A2--83.3% B1--85.7% B2--100%
C--100% D--84.6% E1--75.0% E2--57.1%
F1--70.0% F2--50.0% G--100%

14 The trails are paved with:

A) natural dirt/rock	24.3%
B) grass	8.1%
C) crushed rock	2.7%
D) concrete	5.4%
E) blacktop	27.0%
F) woodchips/bark	29.7%
G) brick	2.7%

15. The users of the special nature trails for the blind are mostly:

A) the normally sighted.	84.6%
B) the blind.	3.8%
C) equal numbers.	11.5%

16. Approximately what percentage of blind visitors are partially sighted?

AVERAGE A) 35.1 %
B) don't know. 66.7%

17. Please give the approximate percentage of visitors who come:

	SIGHTED VISITORS	BLIND VISITORS
A) in organized groups.	58.0 %	68.1 %
B) with family/friends.	32.6 %	31.1 %
C) alone.	9.4 %	0.6 %

18. What problems have you had with the special facilities for the blind? (Check all problem areas.)

ITEM	VANDALISM	MAINTENANCE
A) ropes	62.5%	18.8%
B) railings	0.0%	22.2%
C) signs	52.9%	35.2%
D) tape players	0.0%	20.0%
E) trail surfaces	see below	
F) kickboards	0.0%	0.0%
G) _____		
H) _____		

19. If you were going to design the facilities for the blind all over again, what changes would you make?

trail surfaces:

Dirt/rock	0.0%	50.0%
Grass	0.0%	33.3%
Crushed rock	0.0%	0.0%
concrete	0.0%	0.0%
Blacktop	0.0%	25.0%
Woodchips/bark	0.0%	40.0%

PLEASE RETURN TO: J. M. SCHMANIA
EDUCOM, SUNY ENVIRON. SCI. & FOR.
SYRACUSE, NY 13210

SURVEY ON INTERPRETIVE FACILITIES FOR THE BLIND

Completed by: _____

Date: _____

Directions: Check appropriate box, except where indicated.

1. Do you feel that the blind should be provided with special nature trails designed for their particular use?

   A) yes 42.3% go to #6

   B) no 55.0% go to #2

2. In a few words, please explain why you feel this way:

SEGREGATION IS UNDESIRABLE:	50.8%
BLIND CAN USE REGULAR TRAILS W/ MINIMUM CHANGE:	49.2%
COSTS OUTWEIGH BENEFITS:	21.3%
OTHER REASONS: LESS THAN 7% EACH	

3. What percentage of your clients do you feel would USE such a special trail for the blind..... would RESENT such a special trail?

WOULD USE		WOULD RESENT
33.2 %	AVERAGE	48.2 %

4. Entire nature centers could be designed so that the sighted and the blind could profit equally.

   Assuming that a minimum of adaptations should be used to provide as natural a setting as possible while minimizing costs, please check the items below which you feel are ESSENTIAL:

A) special paving.	11.7%
B) guide rails,	
1) everywhere.	5.0%
2) hazardous areas only.	78.0%
C) guide ropes,	
1) everywhere.	10.0%
2) hazardous areas only.	50.0%
D) kick boards.	3.4%
E) sighted guides.	40.0%
F) braille,	
1) signs.	65.0%
2) booklets.	50.0%
G) large print,	
1) signs.	63.3%
2) booklets.	46.7%
H) tape players.	60.0%
I) CLEARLY DEFINED TRAILS	8.3%
J) TACTILE DISPLAYS	6.7%

5. What percentage of your clients do you feel would take advantage of the nature center you have described in #4?

   AVERAGE = 46.5 %

PLEASE CONTINUE WITH QUESTION #10

6. In a few words, please explain why you feel this way:

GIVES KNOWLEDGE & EXPERIENCE IN OUTDOORS:	27.7%
WOULD BE MORE MEANINGFUL:	21.3%
AID IN DEVELOPMENT OF MOBILITY SKILLS:	19.1%
HELPS DEVELOP INDEPENDENCE:	12.8%
"FOR THE BLIND" MIGHT ATTRACT USERS:	6.4%

7. Please indicate your position on the following features of nature trails for the blind:

	ESSENTIAL	HELPFUL	NOT HELPFUL
A) special paving.	11.6%	60.5%	27.9%
B) guide rails,			
1) everywhere.	12.9%	38.7%	48.4%
2) hazardous areas only.	64.9%	29.7%	5.4%
C) guide ropes,			
1) everywhere.	9.7%	41.9%	48.4%
2) hazardous areas only.	60.6%	18.2%	21.2%
D) kick boards.	3.7%	48.1%	48.1%
E) sighted guides.	14.6%	73.2%	12.2%
F) braille,			
1) signs.	57.1%	38.1%	4.8%
2) booklets.	43.6%	53.8%	2.6%
G) large print,			
1) signs.	64.3%	31.0%	4.8%
2) booklets.	46.3%	51.2%	2.4%
H) tape players.	35.7%	54.8%	9.5%
I) _____			

8. What percentage of your clients do you feel would take advantage of a special trail:

WITH ESSENTIAL ITEMS		WITH HELPFUL ITEMS ALSO
60.0 %	AVERAGE	64.0 %

9. What percentage of your clients do you feel might resent a nature trail intended primarily for the blind?

AVERAGE = 13.5 %

10. On the average, how far do you think that one of your clients could walk in unfamiliar surroundings without becoming overly fatigued?

ANSWERED #1: YES	NO	
2.2%	1.7%	A) under 1/4 mile.
10.9%	10.2%	B) 1/4 - 1/2 mile.
23.9%	15.3%	C) 1/2 - 3/4 mile.
30.4%	22.0%	D) 3/4 - one mile.
19.6%	33.9%	E) over one mile.
13.0%	16.9%	DEPENDS/INDIVIDUAL

11. What do you think of trails with names that emphasize that they are for the handicapped in particular (i.e. "Touch and See Trail for the Blind")?

ANSWERED #1: YES	NO	
17.0%	3.3%	A) in favor.
44.7%	15.0%	B) neutral.
38.3%	81.7%	C) opposed.

12. Blind users of nature trails might best be informed of the position of interpretive stations by:

ANSWERED #1: YES	NO	
35.7%	16.0%	A) a knot in a guide rope.
52.4%	76.0%	B) a change in the trail surface at the site.
LESS THAN 7%		C) ALL OTHERS _____

Please return to: J. R. Schwartz
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Syracuse, NY 13210

Chapter V

Suggestions for Future Design

On the basis of the literature search, informal interviews with visually impaired students at Syracuse University, and the two surveys connected with this investigation, it is now possible to make suggestions for future efforts to involve the VI in nature center interpretive programs.

First of all, there should probably not be a special trail set aside for the VI. Of the Orientation and Mobility instructors responding to the survey, 55% were definitely opposed to a special trail. Due to a semantic problem with the survey, the percentage of the instructors who favor a special trail could not be precisely determined. Many of those who indicated that they were "in favor" of special trails indicated somewhere on the survey instrument that they were concerned mainly that provisions be made so that the visually impaired could benefit from the trails. From the comments made, it might be conjectured that as many as 84% of all the O&M instructors might favor an integrated trail system, rather than a separate trail for the VI.

The idea of a trail "for the blind" sets the VI apart from the "un-blind." Thus, instead of contributing to the integration of the VI into society, such a trail would continue to keep them separate. The VI have enough trouble with the attitudes of many of the sighted as it is, and do not need to be set up as curiosities at the nature center.

The VI, as would any group, do not wish to be patronized. It was thought by the O&M instructors that an average of between 13% (according to those who "favor" special trails) and 48% (according to those "opposed" to special trails) of their clients would resent special treatment. Some of these would not use a special trail

at all; some would use it and then resent it. The latter might leave such an experience with a negative, rather than the hoped-for positive, attitude toward the concepts presented at the nature center.

It should be remembered that while there are only an estimated 450,000 legally blind persons in the United States (those persons with less than 20/200 vision in the better eye with corrective lenses, or with a field of vision of less than 20 degrees in the better eye), there are at least 6.4 million people who have some difficulty seeing even with corrective lenses. All of these would benefit from a trail system designed with the VI in mind. Most of these people probably do not think of themselves as "impaired" in any way, and would not use a trail "for the blind."

The task, then, is to develop a way of adapting all the trails at a nature center so that the VI can derive the maximum benefits, both educational and social, from sharing a learning experience with the sighted.

The first concern of the nature trail designer is to create trails which are clearly defined. Any VI person who has undergone O&M training--and those who haven't are most likely not going to show up at a nature center without at least one sighted companion--can easily "shoreline" their way around a trail, as long as there is a definite distinction between the trail surface and the surrounding vegetation. Shorelining is the following of the intersection of two surfaces, e.g. dirt and grass, or sand and water, with the prescription cane.

I myself, who have had only the slightest of training as a part of this investigation, experienced no difficulty in an attempt to follow a dirt trail through areas of grass, brush and trees while blindfolded, using a collapsible aluminum cane. At one point, however, I did receive a blow on the head from a low branch. It must be remembered that the cane, while it does provide much information about the environment, gives no warning of or protection from, obstacles at head level.

The length of a nature trail need not be a major concern when dealing with the

VI. A loop which is fairly short might be appreciated by the aged and by parents of young children, as well as by some of the VI, but lack of vision does not imply lack of stamina.

It is not, according to about 88% of the O&M instructors, necessary to provide special paving for the VI. Whatever is used for the rest of the public is satisfactory.

There is evidence that this also applies in some degree to those visitors who are confined to wheel chairs. It has been mentioned by staff members of the Connecticut Audubon Society that visitors to the Society's nature centers have had no difficulty in moving wheel chairs over the chipped bark surfaces of the trails there. In experiments conducted in the summer of 1975, I found that wheel chairs can be pushed over chipped bark, as long as the bark is compacted well, and the trail is fairly level.

The generally accepted maximum grade for paths for wheel chairs is 5%. A standard wheel chair is 25 inches wide, so trails should be at least 30 inches wide to allow free movement of the hands. At intervals, it might be advisable to widen the trail to 60 inches to allow for passing. Very sharp turns should be avoided.

To keep the trails looking as natural as possible, it is recommended that guide ropes not be used at all. Only 10% of the O&M instructors "opposed" to special trails, and 9.7% of those "in favor" of special trails, considered guide ropes necessary along the entire length of the trail. Those VI who are capable of reaching a nature center in the first place will not need to hang onto a rope for security, and considering the high rate of vandalism, ropes are probably not worth the expense. Vandalism of ropes was reported by 62.5% of the nature centers which indicated that they use them.

If there is a guide rope along a trail, both the sighted and the VI can use them together. But in this case integration is achieved at the cost of some of the "naturalness" of the experience for the sighted. One normally does not find three-

fourth inch bright yellow ropes strung through the woods. The rope is not only unnatural, it can be an actual barrier between people and nature. Set up at waist height, a rope or railing limits the visitor to just looking at the woods, as he or she might look at an animal in a zoo. It increases the feeling of separation from the natural world, rather than achieving the naturalist's goal of bringing people and nature closer together. An excellent description of this phenomenon is provided by Hallowell in an article about the fencing-in of a waterfall in Massachusetts, published in Natural History Magazine (January, 1976).

Of course, a nature center director must be realistic about potential injuries. The O&M instructors did feel that railings should be provided at dangerous spots along the trail. This is a policy which has been followed by many nature centers for years, whether the trail is for use by the VI or the sighted. Besides the actual job of protecting the visitor from harm, there is the mental reassurance that is provided by knowing there is a strong barrier between the visitor and danger. This reassurance exists for the sighted visitor, and especially for the VI, who might not use a trail if they thought there was a real chance of injury.

Guide rails were considered necessary only at bridges and other hazardous areas, according to 78% of those O&M instructors "opposed" to special trails, and 64.9% of those "in favor" of such trails. A smaller percentage felt that a rope should be used at hazardous areas.

Interpretive sites should be marked by a change in the trail surface (52.4% of those instructors "favoring," 76% of those "opposed" to special trails). A suggestion for so marking a trail would be to dig a small trench across the trail, and fill it with gravel. When visitors step from the regular trail surface onto the gravel, they will feel the difference, as well as hear the crunching sounds of the gravel underfoot.

It is felt as a result of this investigation that the best interpretive device for an integrated trail system would be the cassette tape player, with a printed guide book available for the hard of hearing. Only 7% of the VI can read braille,

due to the increasing number of persons who lose their vision later on in life, and the increase of technological aids, such as "talking books" and tape players. Large-print signs could benefit a larger percentage of the 6.4 million people in the U.S. who have some visual impairment, most of whom do have some residual vision and would not be expected to read braille. Any signs used at a nature center should be made with this in mind. Everybody--with the exception of the deaf, who will be discussed below--can use a tape player.

When used as an auditory map, a tape player can provide very specific directions for getting about, including warnings of hazardous areas, suggestions for particular orientation procedures at certain points, and even directions for getting back on the trail at confusing intersections. It would be a simple matter to add an interpretive message to such a map.

A supply of tape players could be kept at the visitors center and loaned out upon receipt of a deposit, much as is done at many museums. The tape cassettes given to sighted visitors would of course lack the O&M instructions, but the interpretive message could, and should, be the same: In interpreting natural history for the VI, the naturalist is led more and more to bring in all the senses, rather than just sight. And everyone will learn more from reaching out, touching, smelling, listening to, and even tasting nature.

Visual descriptions <u>should not</u> be avoided when dealing with the VI. Verbalism (the use of words which have no meaning in the experiences of the individual, as for example, someone who has never been near the ocean describing the crashing of the surf) is indeed harmful when it is the only way in which the VI know the world. It tends to increase the unreality of the individual's existance. But once the VI have experienced a nature trail, verbalism should not be a problem. The VI deal with the sighted constantly, and should be able to express themselves in visual terms as well as in terms of other senses. The visually impaired <u>do</u> talk about colors, and use such expressions as, "you see what I mean." They have been brought up in our society, and they use its language. There is no need to worry about substitute words.

Tape cassettes are fairly inexpensive to buy, certainly cheaper than permanent signs (one nature center reported paying as much as $40 per braille sign), and they can be erased and used again when desired. The observable phenomena along a nature trail tend to change from season to season and year to year, and it is easier to record a new message on tape than construct a new sign. And of course if visitors are to truly get involved with nature, the trails are bound to suffer a bit in spots. A slight change in the recorded message can direct attention to another area and allow the damaged spot to recover.

Other advantages of the use of tape players are discussed by Dr. J. Alan Wagar in his paper Evaluating Interpretation and Interpretive Media, distributed by the Association of Interpretive Naturalists, Inc., 6700 Needwood Road, Derwood, Maryland 20855. Among other things, Dr. Wagar mentions that visitors often seem to enjoy a nature trail more with a tape player than with signs, and that retention of the interpretive message is greater. Dr. Wagar also stated that in one test he conducted, the tape players were used hundreds of times without loss. None of the nature centers surveyed in this investigation experienced vandalism of tape players if they used them. A majority of the centers (52.9%) using signs reported vandalism. Maintenance problems, primarily weathering, were reported by 35.2% of the centers using signs, compared to 20% reporting maintenance problems with tape players.

The naturalist should not attempt to produce an auditory map alone. Although he or she should certainly decide what interpretive material should be included, a trained O&M instructor can help make the message more meaningful to the VI. An O&M instructor should definitely produce the traveling instructions, since it is difficult for one who has not worked extensively with the VI to know exactly what landmarks are relevent to their traveling needs. Once the script has been written, the taping can be done by anyone with a good recording voice.

Unfortunately, it does not seem possible to provide only one interpretive device for all visitors. While the tape players can provide interpretation for most of the sighted and VI, there are approximately 20 million Americans who are hard of hearing,

about 10% of whom are deaf. These people who could not hear a taped message might be served adequately and inexpensively by printed guide booklets. If these books are in large print, it would be helpful for some of the partially sighted.

Many nature centers have gone out of their way to provide the VI with safe trails. Many have in fact gone too far. By eliminating all the "danger," they have rendered the experience tame and lifeless. The VI have, with the help of O&M training, mastered the streets of our busiest cities. Certainly they can handle a nature trail.

It is a long-standing educational rule of thumb that an exercise or problem should be made challenging enough to stimulate every capacity of the students, and yet not so difficult that there is a real chance of failure. Although it is easy to accept that when faced with constant frustration a child's development will suffer, we often lose sight, in our desire to help in any way possible, of the very real danger of making things too easy. In his book The Blind in School and Society (American Foundation for the Blind, 1951), Thomas Cutsforth states:

> It is detrimental to the normal growth of personality in the blind to protect them from blocking and thwarting. The resourcefulness that develops out of meeting such situations is an important source of training and positive self-feeling. Those who are spared a large part of the difficulty of meeting their own problems . . . through inability to meet their difficulties intelligently, lose many of their desires and settle down into the safety of almost utter inactivity.

Of course the nature center director must be aware of the potential for harm, but at the same time, the VI need no pampering. Any situation which is safe for the sighted is safe for the VI.

Throughout this paper I have been dealing with generalities and averages. In many cases I have dealt with the VI as if they were a homogeneous group. They are not. There are as many kinds of visual impairment, and as many ways of adjusting to it, as there are visually impaired persons. There are many who suffer from more than lack of vision: Some are deaf as well, some confined to wheel chairs, some mentally retarded. It is only to bring the challenge presented to the naturalist by the VI down to a manageable level that I have not dealt with the special problems.

The interpretive nature trail is not offered as a panacea for all the problems of the VI. Yet in many ways it can help. If the trail can in some way be designed for use by both the sighted and the VI, allowing the sighted to deal with the VI as real persons, perhaps familiarity will bring an end to the stereotypes. Certainly the elimination of special trails "for the blind" would help to end the feeling, among both the sighted and the VI who use the trails, that the VI are "different."

Secondly, if direct experience with the world is what is needed for the VI to truly understand it, a trip to a nature center might help to eliminate verbalism to some degree. As the outdoor educators were saying almost a century ago, what is best learned in the outdoors, through direct experience, should be learned there.

In every case, the naturalist must strive to make the VI feel welcome, not patronized, to challenge their abilities, not coddle them, to increase their horizons, and not shut them away in special places.

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